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OHIO DEPARTMENT OF NATURAL RESOURCES, DIVISION OF WATER  
1562 W. First Ave., Columbus 12, Ohio

OHIO WATER PLAN INVENTORY  
1959

EPA Region 5 Records Ctr.

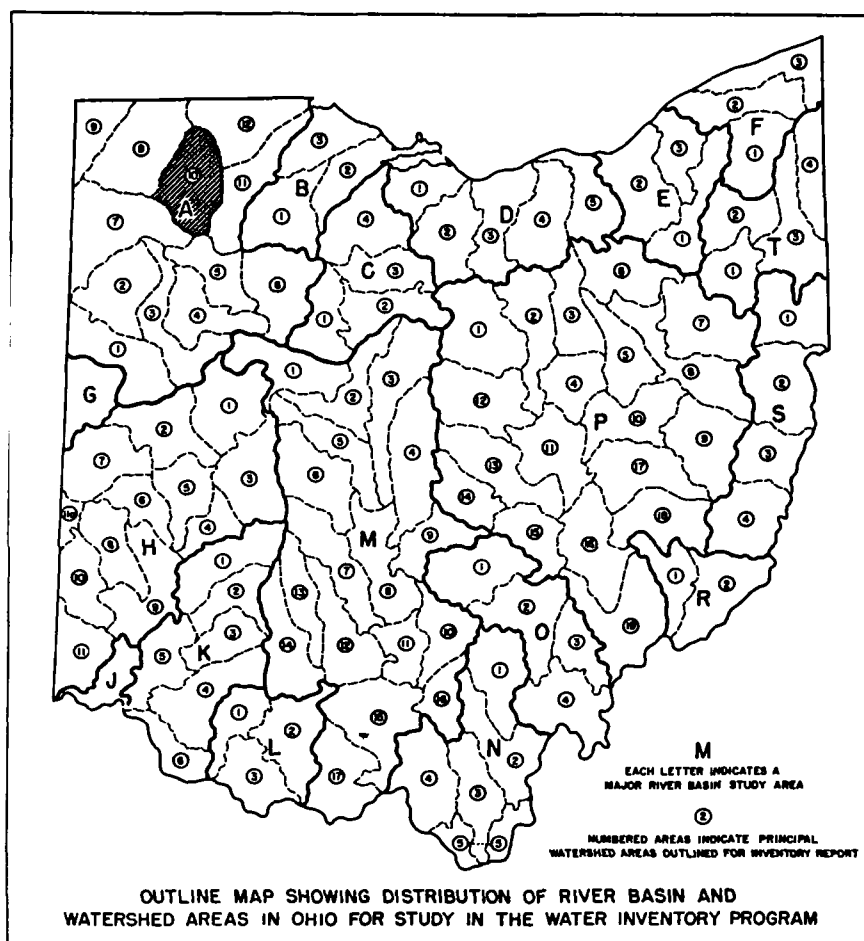


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**MAUMEE RIVER BASIN**  
(Middle portion)

**UNDERGROUND WATER RESOURCES**

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from data compiled by Lawrence R. Brunstetter.



FILE INDEX  
A-10

Underground water is the water that occurs in the pores or openings of the rocks. The amount of underground water available in any area depends upon the size, shape and number of water-bearing openings in the rock. For this reason, wide variations in underground-water conditions are found as the geology differs from place to place.



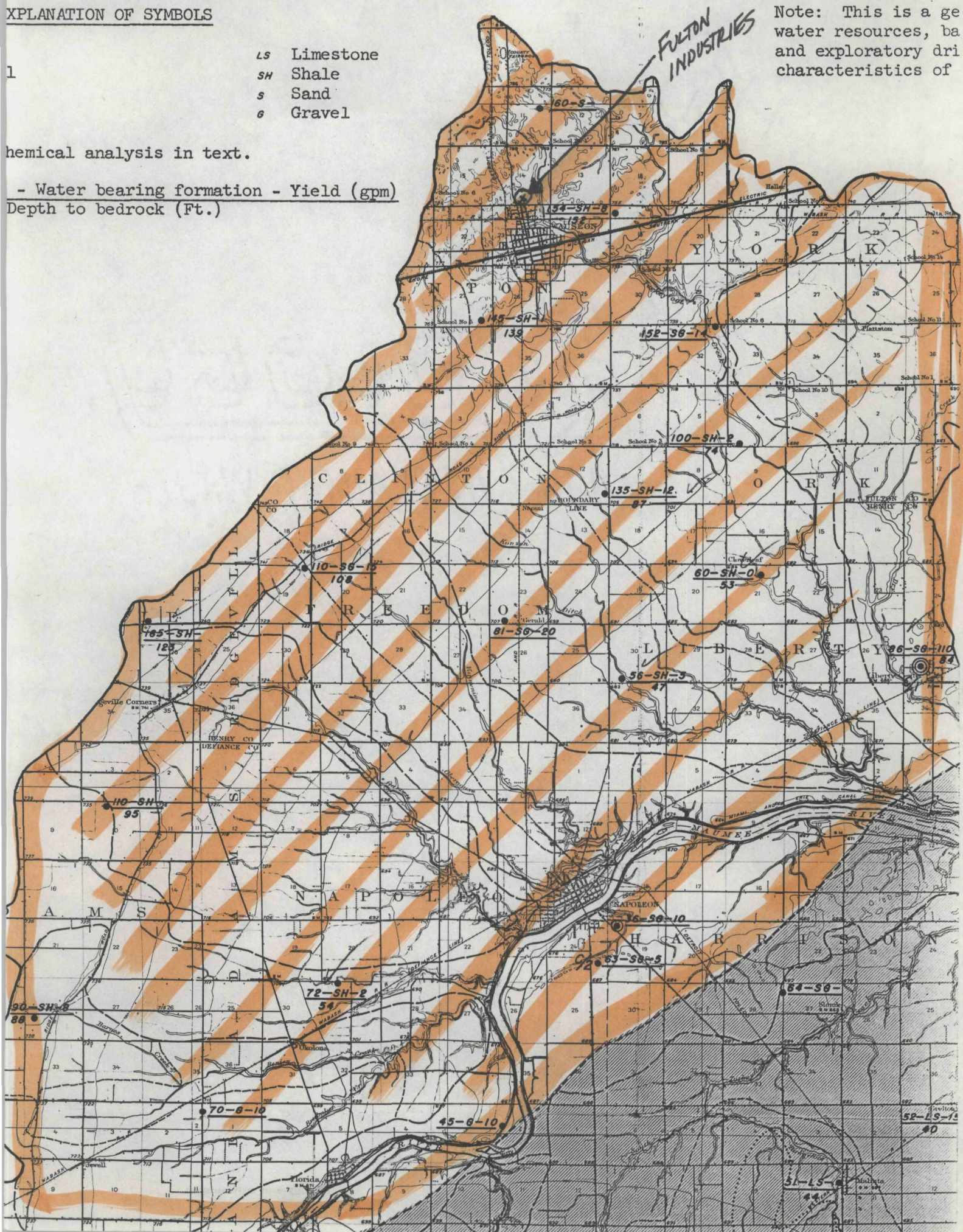
# EXPLANATION OF SYMBOLS

LS Limestone  
SH Shale  
S Sand  
G Gravel

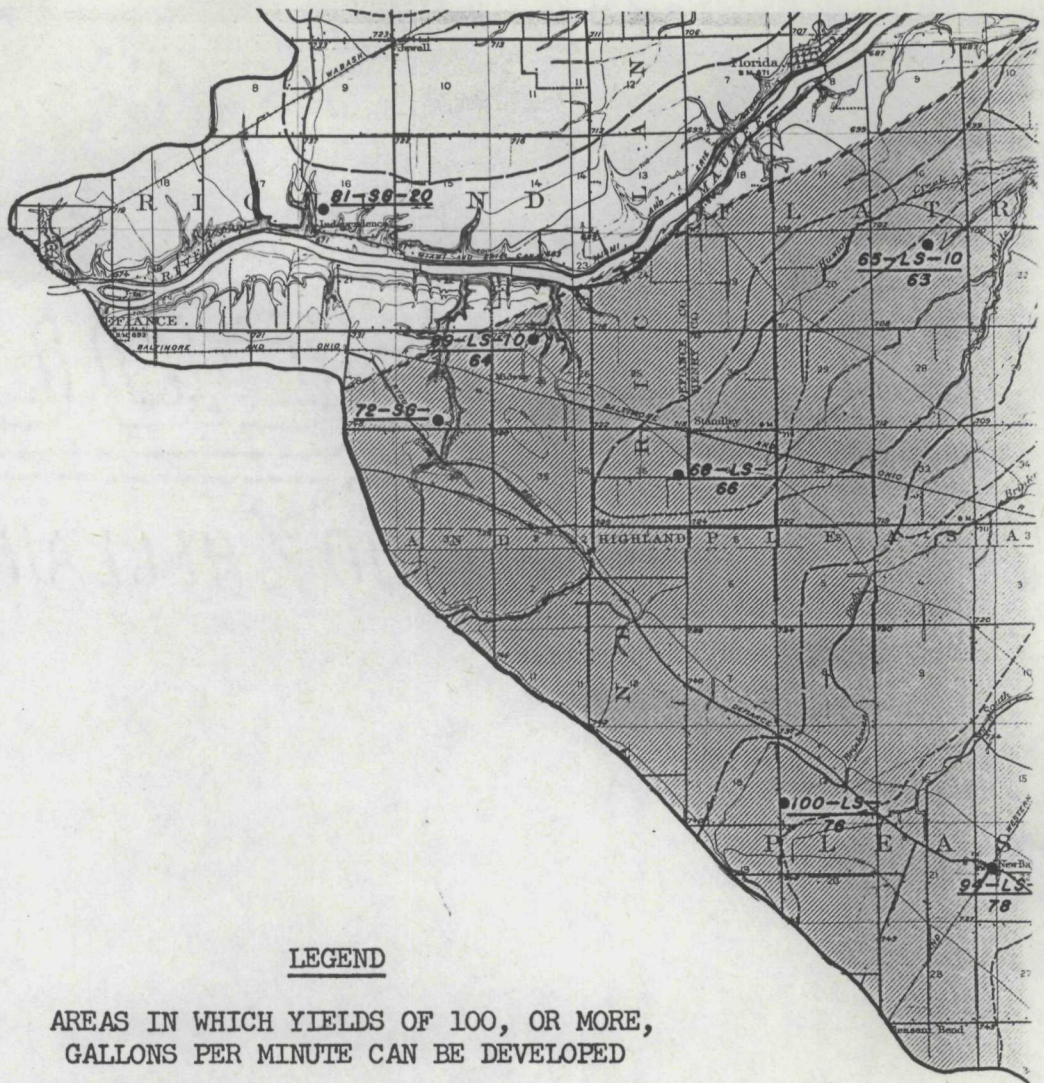
Note: This is a ge  
water resources, ba  
and exploratory dri  
characteristics of

hemical analysis in text.

- Water bearing formation - Yield (gpm)  
Depth to bedrock (Ft.)







#### LEGEND

AREAS IN WHICH YIELDS OF 100, OR MORE,  
GALLONS PER MINUTE CAN BE DEVELOPED



Limestone, covered with  
from 20 to 80 feet of till,  
may supply 200 gallons per  
minute at depths of 300  
feet or less. Sand and  
gravel lenses in the till  
generally yield less than  
10 gallons per minute.

AREAS IN WHICH YIELDS OF 25, OR MORE,  
GALLONS PER MINUTE CAN BE DEVELOPED



Glacial drift, averaging  
90 feet thick, covers  
shale bedrock. Occasional  
yields of 100 gallons per  
minute may be obtained from  
sand and gravel deposits.  
Small supplies available  
from upper portion of shale.

The bedrock beneath the basin area consists of limestone and dolomite of Silurian and Devonian ages in the south, and Devonian shale in the north. The thickness of glacial drift covering the bedrock becomes greater from south to north, ranging from less than 50 feet near Hamler to over 180 feet in the vicinity of Wauseon. In areas where the drift is thick, it may contain coarse sand and gravel lenses of limited extent which are capable of supplying up to 100 gallons per minute to wells. Smaller supplies are obtained as the drift covering becomes thinner to the south.

Small yields are sometimes available from the upper portion of the shale where, due to weathering, it is porous enough to contain water. Water from the shale, however, often contains varying amounts of sulfur and gas.

Limestone is generally a good source of underground-water supplies. Wells drilled into limestone are supplied through joints and solution openings in the rock. The number and size of these openings vary from one locality to another within the same rock formation. Yields of as much as 200 gallons per minute may be obtained from limestone, in the basin area, at depths of 300 feet or less. The water is hard and may be high in hydrogen sulfide.

The two most important water sources in the basin are best illustrated by well logs.

A well drilled at Holgate, in the southern part of the area, was developed in the limestone bedrock.

<u>Formation</u>	<u>Thickness (ft.)</u>	<u>Depth (ft.)</u>
Clay	50	50
Limestone	260	310
Well diameter: 8 inches		
Yield: 180 gallons per minute.		
Static water level: 42 ft. below land surface.		

In the northern part, near Wauseon, sand and gravel in thick glacial deposits provide the water source.

<u>Formation</u>	<u>Thickness (ft.)</u>	<u>Depth (ft.)</u>
Yellow clay	10	10
Blue clay	62	72
Hardpan	3	75
Blue clay	18	93
Sand	1	94
Blue clay	12	106
Hardpan	8	114
Blue clay	11	125
Water sand	19	144
Blue clay	1	145
Coarse sand and gravel	8	153
Well diameter: 6 inches.		
Yield: 14 gallons per minute.		
Static water level: 31 ft. below land surface.		

Blue clay	1	145
Coarse sand and gravel	8	153
Well diameter: 6 inches.		
Yield: 14 gallons per minute.		
Static water level: 31 ft. below land surface.		

#### QUALITY OF WATER

Sulfur water is common throughout the basin area. It is found in almost all wells drilled into the bedrock and also in some of the sand and gravel wells.

Partial analyses of the water obtained from three wells are shown in the following table.

Sample number 3 contains excessive iron which is likely to cause "red water." On exposure to air, iron oxide forms as a precipitate. Excessive iron will stain laundry, plumbing fixtures and other water containers.

The chloride content of the samples is negligible.

Water that has less than 50 parts per million hardness is usually rated as soft and its treatment for removal of hardness is seldom justified. Hardness between 50 and 150 ppm (sample 2) does not interfere with the use of water for many purposes, but its removal by softening processes may be profitable for laundries and other industries. Water with hardness beyond 150 ppm, such as sample number 3, usually requires some treatment for removal of hardness before being used.

Well No.	C-1	C-2	C-3
Depth (ft.)	86	63	54
Water-bearing formation	sand and gravel	sand and gravel	limestone
	Parts per million		
Iron	0.45	0.79	*1.0
Chloride	31.0	3.5	10.0
Dissolved solids	358.	246.	1573.
Total hardness	156.	136.	*820.
pH	7.4	7.2	7.4

\*Would require treatment for most uses.



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Records of approximately 750 water wells in the basin are on file at the Ohio Division of Water. Locations of a number of typical wells are shown on the map.

GENERALIZED STRATIGRAPHIC SEQUENCE OF THE ROCKS  
IN THE MAUMEE RIVER BASIN (MIDDLE PORTION)

System or Series		Group or Formation	Character of Material	Water-bearing Characteristics
Quaternary	Recent		Clay, silt and alluvium deposited on flood plains of the major streams.	Generally a poor source of water due to fineness of the material.
	Pleistocene		Sands and gravels interbedded with less permeable glacial material.	Quantity of ground water available depends upon the extent of sand and gravel and source of recharge.
			Till, a heterogeneous mixture of clay, sand and gravel with a predominance of clay.	Generally not a source of ground water, although in places gravel lenses within the till will yield small domestic supplies.
Devonian		Ohio	Dark, dense shale.	Small supplies in upper portion where the rock is somewhat jointed and broken.
	Traverse		Bluish-gray dolomite. Fairly dense.	Fair water source. May contain sulfur.
			Gray shale with limestone beds.	Little water available. May contain sulfur.
	Dundee		Dolomitic limestone.	Dependable water source.
	Detroit River		Gray to tan limestones and dolomites, grading into sandstone in lower portion.	Source of domestic supplies. Contains sulfur in most cases.
Silurian		Bass Islands	Brown to gray, massive to thin-bedded dolomites.	Dependable source of water over large areas.
		Niagara	Brown to blue-gray dolomites. Shaley in lower portion.	Dependable water source. May contain sulfur in varying amounts.
		Clinton	Undifferentiated.	
		Medina		
Ordovician		Richmond	Water-bearing properties not considered.	